

**Claims:**

1. An isolated nucleic acid molecule encoding a hyperimmune serum reactive antigen or a fragment thereof comprising a nucleic acid sequence, which is selected from the group consisting of:
  - a) a nucleic acid molecule having at least 70% sequence identity to a nucleic acid molecule selected from Seq ID No 31-60.
  - b) a nucleic acid molecule which is complementary to the nucleic acid molecule of a),
  - c) a nucleic acid molecule comprising at least 15 sequential bases of the nucleic acid molecule of a) or b)
  - d) a nucleic acid molecule which anneals under stringent hybridization conditions to the nucleic acid molecule of a), b), or c)
  - e) a nucleic acid molecule which, but for the degeneracy of the genetic code, would hybridize to the nucleic acid molecule defined in a), b), c) or d).
2. The isolated nucleic acid molecule according to claim 1, wherein the sequence identity is at least 80%, preferably at least 95%, especially 100%.
3. An isolated nucleic acid molecule encoding a hyperimmune serum reactive antigen or a fragment thereof comprising a nucleic acid sequence selected from the group consisting of
  - a) a nucleic acid molecule having at least 96%, preferably at least 98 % especially 100 % sequence identity to a nucleic acid molecule selected from Seq ID No 5, 7-8, 14-16, 18-22, 24-27, 29-30.
  - b) a nucleic acid molecule which is complementary to the nucleic acid molecule of a),
  - c) a nucleic acid molecule comprising at least 15 sequential bases of the nucleic acid molecule of a) or b)
  - d) a nucleic acid molecule which anneals under stringent hybridisation conditions to the nucleic acid molecule of a), b) or c),
  - e) a nucleic acid molecule which, but for the degeneracy of the genetic code, would hybridise to the nucleic acid defined in a), b), c) or d).
4. The nucleic acid molecule according to any one of the claims 1, 2, or 3, wherein the nucleic acid is DNA.
5. The nucleic acid molecule according to any one of the claims 1, 2, 3, or 4, wherein the nucleic acid is RNA.
6. An isolated nucleic acid molecule according to any one of claims 1 to 4, wherein the nucleic acid molecule is isolated from a genomic DNA, especially from a *C. pneumoniae* genomic DNA.
7. A vector comprising a nucleic acid molecule according to any one of claims 1 to 6.
8. A vector according to claim 7, wherein the vector is adapted for recombinant expression of the hyperimmune serum reactive antigens or fragment thereof encoded by the nucleic acid molecule according to any one of claims 1 to 6.
9. A host cell comprising the vector according to claim 7 or 8.
10. A hyperimmune serum-reactive antigen comprising an amino acid sequence being encoded by a nucleic acid molecule according to any one of the claims 1, 2, 4, 5 or 6 and fragments thereof, wherein the amino acid sequence is selected from the group consisting of Seq ID No 91-120.
11. A hyperimmune serum-reactive antigen comprising an amino acid sequence being encoded by a

nucleic acid molecule according to any one of the claims 3, 4, 5, or 6 and fragments thereof, wherein the amino acid sequence is selected from the group consisting of Seq ID No 65, 67-68, 74-76, 78-82, 84-87, 89-90.

12. Fragments of hyperimmune serum-reactive antigens selected from the group consisting of peptides comprising amino acid sequences of column "predicted immunogenic aa", "Predicted class II restricted T-Cell epitopes / regions" "Predicted class I restricted T-Cell epitope / regions", and "location of identified immunogenic region" of Table 1; the serum reactive peptide epitopes of Table 2, especially peptides comprising amino acids 18-29, 60-78, 89-95, 100-105, 124-143, 166-180, 187-194, 196-208, 224-242, 285-294, 305-311, 313-320, 351-360, 368-373, 390-403, 411-429, 432-470, 483-489, 513-523, 535-543, 548-564, 579-587, 589-598, 604-612, 622-627, 632-648, 55-84, 190-207, 323-331, 370-390, 551-570, 606-614, 633-647, 39-129, 224-296 and 464-609 of Seq ID No 61; and fragments in 9 amino acid length starting from the position of: 60, 63, 67, 70, 126, 129, 133, 136, 169, 186, 200, 308, 371, 414, 421, 434, 444, 459, 503, 512, 532, 540, 547, 601, 625, 632, 634, 637, 99, 529, 25, 38, 59, 155, 278, 285, 412, 420, 441, 451, 457, 481, 506, 510, 524, 536, 539, 554, 578, 596, 638, 179 and 604 of Seq ID No 61; 4-29, 31-38, 46-64, 66-80, 109-115, 131-139, 152-160, 170-183, 198-234, 239-255, 267-290, 301-313, 318-324, 336-345, 350-365, 380-386, 65-82, 123-165, 268-290, 299-307, 320-329, 336-347, 76-103, 226-239 and 267-333 of Seq ID No 62; and fragments in 9 amino acid length starting from the position of: 4, 13, 69, 93, 149, 174, 273, 277, 298, 305, 312, 319, 375, 28, 303, 3, 58, 73, 100, 153, 191, 223, 227, 232, 251, 269, 286, 343, 374 and 238 of Seq ID No 62; 20-33, 35-43, 47-60, 77-92, 113-124, 137-145, 185-196, 66-75 and 92-214 of Seq ID No 63; and fragments in 9 amino acid length starting from the position of: 32, 48, 49, 113, 77, 118, 139, 185, 2, 24 and 120 of Seq ID No 63; 47-64, 137-155, 157-167, 182-198, 212-233, 247-259, 291-303, 315-337, 345-350, 355-368, 373-379, 58-72, 183-196, 249-261, 315-323, 334-342, 347-356, 358-366 and 6-188 of Seq ID No 64; and fragments in 9 amino acid length starting from the position of: 135, 160, 183, 184, 204, 249, 256, 293, 296, 318, 319, 356, 372, 94, 13, 60, 159, 163, 189, 204, 220, 233, 300, 333, 335, 356, 362, 198 and 289 of Seq ID No 64; 4-36, 43-49, 60-75, 96-107, 113-123, 132-172, 186-193, 217-229, 231-250, 260-282, 284-290, 298-312, 315-330, 5-38, 67-77, 113-127, 134-145, 147-156, 220-236, 271-283, 285-293, 296-304, 309-321 and 159-217 of Seq ID No 65; and fragments in 9 amino acid length starting from the position of: 3, 10, 14, 17, 24, 46, 59, 133, 155, 220, 270, 312, 233, 2, 22, 31, 36, 62, 65, 122, 140, 155, 162, 170, 189, 235, 248, 260, 286, 298, 156, 183 and 325 of Seq ID No 65; 5-26, 29-50, 52-61, 65-74, 89-96, 140-147, 153-162, 183-188, 191-197, 203-210, 213-225, 1-9, 30-38, 53-63, 70-78, 92-107, 141-149, 158-166, 174-191, 205-224 and 97-113 of Seq ID No 66; and fragments in 9 amino acid length starting from the position of: 31, 33, 39, 56, 63, 78, 119, 136, 196, 14, 35, 38, 55, 97, 98, 146, 156, 158, 215, 88 and 214 of Seq ID No 66; 31-36, 46-54, 65-80, 86-102, 168-175, 179-186, 188-194, 200-208, 210-216, 225-231, 243-257, 289-296, 362-387, 460-474, 476-486, 504-511, 518-525, 569-579, 581-600, 665-684, 688-694, 700-705, 717-735, 182-193, 202-211, 279-294, 311-319, 369-377, 468-476, 547-558, 579-587, 681-700, 731-740, 92-177 and 591-604 of Seq ID No 67; and fragments in 9 amino acid length starting from the position of: 28, 78, 285, 309, 321, 376, 379, 388, 468, 475, 479, 500, 571, 624, 668, 716, 360, 455, 669, 185, 190, 204, 264, 281, 292, 478, 502, 588, 675, 680, 716 and 730 of Seq ID No 67; 4-9, 17-24, 27-52, 66-77, 91-98, 104-124, 127-139, 178-199, 211-219, 221-228, 234-244, 246-255, 263-286, 303-312, 316-321, 337-346, 356-362, 367-372, 377-390, 402-416, 449-459, 465-479, 491-501, 503-508, 523-541, 551-558, 560-565, 31-69, 115-127, 132-143, 145-165, 176-187, 190-204, 212-220, 266-286, 304-316, 403-423, 440-456, 523-544 and 9-22 of Seq ID No 68; and fragments in 9 amino acid length starting from the position of: 17, 24, 31, 45, 53, 56, 63, 69, 107, 129, 150, 171, 178, 189, 191, 217, 255, 273, 277, 305, 312, 451, 458, 470, 478, 506, 522, 71, 379, 20, 29, 34, 44, 119, 133, 276, 284, 300, 328, 404, 465, 470, 529, 543, 182 and 551 of Seq ID No 68; 34-42, 52-63, 71-87, 112-120, 142-147, 154-159, 166-177, 180-197, 204-224, 237-256, 260-268, 280-286, 312-324, 338-343, 372-412, 456-463, 479-490, 494-504, 506-512, 518-524, 538-548, 562-573, 585-591, 597-606, 674-690, 703-712, 714-740, 749-766, 95-103, 114-123, 180-195, 205-220, 240-248, 370-400, 481-495, 588-596, 707-715, 750-765, 160-253 and 630-717 of Seq ID No 69; and fragments in 9 amino acid length starting from the position of: 179, 206, 209, 213, 216, 255, 286, 300, 304, 324, 365, 369, 373, 376, 377, 380, 381, 384, 562, 694, 720, 721, 729, 749, 752, 755, 197, 330, 559, 592, 600, 714, 751,

- 73 -

91, 111, 140, 167, 191, 315, 388, 393, 402, 458, 463, 587, 720, 762 and 748 of Seq ID No 69; 4-44, 50-55, 59-67, 73-83, 91-98, 101-109, 131-145, 230-236, 267-273, 293-300, 303-310, 349-354, 375-397, 404-416, 434-441, 445-452, 456-468, 479-485, 487-512, 544-568, 571-579, 593-599, 604-610, 614-621, 642-656, 665-678, 706-716, 729-736, 748-756, 780-795, 797-814, 827-844, 850-861, 864-882, 889-900, 906-933, 6-23, 28-36, 64-75, 134-150, 182-192, 227-236, 306-316, 340-350, 376-387, 421-435, 449-460, 527-535, 553-569, 587-595, 641-657, 668-676, 683-694, 743-755, 800-819, 843-865, 861-886, 894-915, 929-938 and 603-669 of Seq ID No 70; and fragments in 9 amino acid length starting from the position of: 7, 8, 15, 73, 80, 133, 134, 138, 182, 194, 271, 272, 298, 432, 438, 457, 458, 487, 490, 527, 548, 568, 616, 644, 647, 667, 741, 782, 801, 829, 866, 126, 259, 792, 15, 20, 133, 155, 160, 232, 299, 458, 464, 552, 558, 560, 605, 607, 654, 670, 672, 768, 810, 840, 852, 877, 900, 167, 380, 425, 593 and 907 of Seq ID No 70; 4-32, 73-82, 90-101, 116-132, 144-160, 171-182, 195-200, 227-234, 255-271, 293-300, 313-336, 344-350, 369-375, 381-398, 413-421, 436-465, 487-496, 503-508, 510-527, 538-546, 552-562, 608-614, 617-636, 663-674, 679-691, 705-730, 734-748, 769-807, 825-834, 848-861, 864-871, 891-902, 7-16, 90-107, 110-137, 170-187, 197-213, 233-251, 277-287, 291-314, 361-390, 412-425, 451-465, 489-498, 513-521, 570-580, 619-637, 662-679, 713-721, 725-733, 745-754, 766-781, 790-805, 817-834, 868-883, 888-903 and 529-542 of Seq ID No 71; and fragments in 9 amino acid length starting from the position of: 8, 23, 53, 57, 128, 169, 178, 239, 263, 290, 297, 310, 324, 331, 339, 365, 398, 436, 443, 450, 470, 485, 488, 513, 514, 520, 614, 669, 711, 723, 771, 824, 849, 895, 316, 861, 118, 135, 196, 225, 284, 290, 370, 454, 489, 492, 521, 557, 624, 632, 745, 778, 783, 850, 868, 910, 226 and 383 of Seq ID No 71; 10-18, 30-52, 63-70, 72-79, 96-133, 146-158, 168-175, 184-193, 203-210, 213-222, 227-234, 237-257, 263-273, 285-291, 297-312, 320-338, 359-378, 385-393, 395-410, 412-421, 490-510, 521-527, 540-548, 563-571, 573-585, 592-598, 615-620, 632-641, 652-661, 672-679, 704-711, 717-723, 729-736, 742-751, 766-778, 788-808, 817-824, 836-842, 34-56, 73-89, 103-130, 146-154, 184-205, 213-227, 245-257, 258-278, 292-316, 331-341, 358-369, 372-383, 388-397, 410-418, 503-514, 524-530, 548-556, 565-573, 584-595, 637-646, 656-663, 673-686, 734-742, 745-754, 757-768, 770-781, 816-828 and 14-101 of Seq ID No 72; and fragments in 9 amino acid length starting from the position of: 27, 32, 36, 65, 109, 112, 120, 127, 186, 249, 250, 262, 267, 297, 301, 353, 360, 367, 410, 418, 436, 465, 472, 505, 518, 522, 565, 576, 585, 638, 645, 650, 676, 687, 724, 745, 756, 763, 795, 164, 411, 510, 560, 569, 647, 766, 780, 14, 39, 48, 65, 74, 129, 175, 215, 217, 229, 230, 240, 253, 257, 262, 269, 308, 317, 322, 327, 352, 371, 372, 373, 374, 417, 443, 454, 472, 514, 525, 567, 629, 637, 657, 662, 683, 698, 731, 744, 752, 763, 769, 787, 790, 802, 815, 819, 26, 102, 381 and 704 of Seq ID No 72; 4-14, 20-33, 36-63, 71-93, 96-104, 106-117, 120-128, 131-147, 161-172, 174-186, 195-210, 212-247, 269-286, 288-301, 306-322, 324-332, 348-354, 356-363, 384-391, 35-66, 70-85, 107-118, 124-132, 165-179, 186-196, 197-205, 276-289, 292-300, 348-368, 369-381, 385-394 and 139-151 of Seq ID No 73; and fragments in 9 amino acid length starting from the position of: 34, 41, 50, 53, 109, 127, 134, 153, 165, 271, 286, 297, 340, 384, 80, 321, 334, 354, 33, 57, 110, 153, 178, 276, 284, 383, 79, 99 and 123 of Seq ID No 73; 12-20, 37-48, 51-58, 69-75, 86-98, 113-136, 141-161, 171-216, 222-254, 264-273, 291-301, 311-345, 351-361, 31-39, 40-55, 62-74, 121-137, 148-164, 170-178, 223-253, 309-329, 354-369 and 246-275 of Seq ID No 74; and fragments in 9 amino acid length starting from the position of: 46, 95, 103, 110, 143, 156, 178, 186, 190, 236, 242, 244, 291, 294, 315, 333, 353, 125, 183, 256, 326, 3, 68, 82, 102, 131, 177, 185, 190, 193, 223, 224, 244, 250, 295, 340, 349, 354, 88 and 89 of Seq ID No 74; 30-36, 50-56, 96-102, 110-116, 125-131, 162-174, 179-187, 189-201, 223-230, 232-239, 266-278, 320-328, 330-337, 339-350, 388-400, 408-413, 417-423, 435-447, 456-480, 499-524, 526-534, 53-62, 92-107, 192-203, 315-323, 436-452, 464-483, 502-524 and 61-138 of Seq ID No 75; and fragments in 9 amino acid length starting from the position of: 126, 174, 225, 267, 309, 316, 320, 337, 436, 466, 467, 473, 474, 14, 128, 143, 228, 347, 494, 2, 52, 112, 201, 209, 217, 230, 235, 236, 337, 381, 395, 413, 419, 454, 466, 510, 515 and 556 of Seq ID No 75; 7-32, 36-56, 77-82, 88-100, 117-144, 153-166, 173-180, 188-226, 256-297, 300-316, 323-337, 339-348, 361-384, 390-427, 438-455, 476-488, 516-523, 535-566, 580-586, 597-607, 615-621, 626-634, 639-649, 654-660, 668-673, 677-688, 707-714, 716-728, 730-742, 746-756, 763-772, 801-808, 820-829, 840-875, 882-888, 895-911, 914-920, 928-948, 953-961, 987-995, 999-1005, 1007-1026, 1053-1060, 1071-1079, 1082-1117, 1123-1129, 6-31, 37-48, 58-69, 90-105, 110-118, 134-142, 146-157, 210-220, 267-276, 291-300, 319-330, 362-372, 393-401, 405-421, 447-456, 463-471, 517-525, 574-582, 597-612, 618-626, 642-650, 656-668, 668-678, 683-695, 725-733, 778-791, 840-849, 894-917, 927-939, 954-963, 966-974, 978-998,

1010-1021, 1056-1067, 1070-1083, 1090-1104 and 325-389 of Seq ID No 76; and fragments in 9 amino acid length starting from the position of: 11, 18, 22, 41, 48, 86, 104, 156, 190, 197, 221, 286, 290, 334, 343, 345, 407, 442, 509, 538, 575, 596, 597, 598, 636, 678, 685, 723, 754, 757, 779, 818, 850, 857, 864, 893, 900, 901, 907, 918, 927, 934, 972, 988, 1018, 1025, 1034, 1048, 1065, 1072, 1089, 1094, 1101, 1108, 127, 336, 411, 806, 852, 28, 68, 90, 91, 93, 158, 293, 310, 350, 368, 380, 394, 425, 441, 461, 554, 569, 597, 628, 667, 684, 724, 737, 752, 761, 767, 804, 851, 897, 907, 933, 979, 1030, 1032, 1051, 1075, 1090, 1125, 133, 308, 502, 797, 939 and 960 of Seq ID No 76; 11-19, 34-53, 55-91, 113-119, 122-129, 131-140, 157-170, 173-179, 188-195, 200-206, 208-220, 222-232, 236-244, 250-265, 267-274, 282-290, 293-301, 317-323, 336-343, 355-361, 372-384, 33-54, 69-95, 210-221, 244-254, 257-269 and 324-351 of Seq ID No 77; and fragments in 9 amino acid length starting from the position of: 32, 37, 43, 47, 50, 53, 57, 64, 68, 71, 73, 74, 78, 80, 82, 113, 120, 155, 162, 194, 205, 209, 231, 235, 238, 252, 259, 266, 273, 280, 287, 294, 301, 308, 315, 333, 8, 16, 18, 66, 377, 36, 44, 81, 99, 124, 193, 261 and 319 of Seq ID No 77; 31-55, 58-64, 69-75, 81-90, 129-150, 154-167, 179-184, 189-208, 227-237, 248-271, 277-284, 313-340, 350-358, 361-368, 371-378, 384-390, 418-425, 438-444, 455-468, 487-506, 514-523, 525-550, 558-569, 572-578, 588-598, 607-618, 645-651, 653-665, 672-684, 708-715, 717-742, 754-771, 776-782, 786-802, 806-817, 1-9, 31-46, 52-61, 60-78, 132-148, 182-199, 214-229, 249-264, 280-293, 320-341, 347-355, 386-411, 486-502, 553-575, 624-634, 673-689, 690-700, 702-714, 721-735, 736-746, 757-777, 788-798, 810-818 and 90-100 of Seq ID No 78; and fragments in 9 amino acid length starting from the position of: 51, 82, 139, 186, 193, 197, 200, 239, 248, 249, 250, 257, 311, 325, 326, 520, 555, 556, 589, 606, 651, 716, 723, 730, 737, 758, 761, 772, 788, 39, 41, 569, 695, 709, 783, 51, 60, 89, 110, 141, 207, 216, 295, 301, 395, 404, 518, 527, 555, 568, 593, 596, 673, 691, 722, 757, 772, 790, 799, 130, 131, 179, 402, 414 and 701 of Seq ID No 78; 13-19, 22-28, 61-67, 74-81, 86-103, 110-122, 141-155, 162-169, 171-177, 181-186, 192-199, 201-207, 225-238, 246-263, 273-279, 287-300, 307-313, 331-336, 351-367, 370-376, 380-392, 395-402, 415-422, 424-451, 454-465, 473-492, 496-509, 515-523, 541-547, 569-582, 589-601, 613-636, 638-647, 653-679, 702-714, 721-729, 739-748, 768-779, 799-813, 821-828, 832-840, 847-853, 857-873, 886-892, 894-905, 917-926, 958-971, 974-981, 983-989, 997-1004, 1006-1032, 1034-1049, 1054-1061, 1063-1069, 1073-1081, 1083-1095, 1097-1115, 1122-1132, 1143-1153, 1164-1171, 1178-1185, 1193-1213, 1216-1251, 1258-1272, 1277-1283, 1305-1317, 1324-1330, 1333-1355, 1383-1390, 25-43, 81-92, 111-141, 150-159, 213-220, 222-242, 243-254, 256-267, 276-288, 289-307, 381-397, 398-409, 422-438, 441-464, 485-500, 515-528, 542-553, 569-585, 591-601, 639-649, 656-664, 709-719, 725-734, 739-753, 841-850, 883-893, 902-911, 912-926, 935-948, 960-969, 976-984, 994-1008, 1037-1047, 1073-1085, 1100-1108, 1124-1134, 1167-1179, 1194-1203, 1220-1254, 1258-1277, 1308-1319, 1348-1366 and 273-290 of Seq ID No 79; and fragments in 9 amino acid length starting from the position of: 107, 110, 112, 133, 152, 200, 204, 223, 244, 251, 271, 289, 291, 305, 323, 360, 380, 407, 422, 428, 440, 491, 507, 512, 536, 616, 625, 628, 648, 650, 665, 668, 748, 768, 784, 797, 801, 826, 858, 859, 903, 910, 913, 925, 932, 959, 960, 968, 993, 1008, 1020, 1068, 1072, 1138, 1141, 1142, 1193, 1201, 1218, 1226, 1237, 1261, 1271, 1311, 1348, 1349, 1377, 126, 375, 433, 477, 608, 658, 852, 1106, 1121, 1303, 1362, 24, 102, 151, 164, 169, 211, 229, 245, 274, 279, 285, 333, 348, 361, 382, 391, 397, 428, 447, 453, 480, 496, 590, 591, 595, 615, 623, 629, 638, 664, 669, 672, 738, 744, 775, 789, 840, 910, 917, 939, 966, 977, 1057, 1084, 1096, 1119, 1127, 1128, 1145, 1163, 1167, 1202, 1214, 1238, 1244, 1260, 1279, 1335, 145, 355, 961, 1053, 1103 and 1245 of Seq ID No 79; 16-23, 25-47, 49-59, 64-72, 79-91, 95-105, 113-122, 133-145, 148-162, 169-176, 179-188, 190-200, 202-218, 232-239, 250-283, 299-333, 337-344, 349-355, 364-406, 430-437, 439-449, 452-460, 464-490, 492-503, 505-530, 533-562, 12-21, 28-39, 52-67, 115-124, 189-204, 224-232, 234-242, 263-284, 302-322, 363-385, 389-397, 446-463, 479-488, 513-522, 528-552 and 401-419 of Seq ID No 80; and fragments in 9 amino acid length starting from the position of: 23, 30, 58, 78, 84, 97, 98, 120, 123, 133, 162, 169, 189, 215, 218, 236, 309, 312, 316, 365, 372, 384, 388, 391, 426, 446, 453, 465, 466, 478, 508, 513, 515, 523, 530, 536, 543, 554, 333, 467, 13, 19, 115, 130, 181, 195, 225, 262, 270, 275, 311, 313, 325, 342, 390, 391, 398, 461, 530, 116, 188 and 229 of Seq ID No 80; 8-16, 36-54, 59-76, 85-92, 104-124, 137-180, 199-248, 255-298, 300-307, 324-339, 356-373, 381-393, 402-442, 448-455, 18-27, 36-56, 101-120, 145-158, 165-173, 179-189, 239-255, 255-270, 330-346, 355-375, 383-394, 403-421 and 83-232 of Seq ID No 81; and fragments in 9 amino acid length starting from the position of: 5, 102, 149, 156, 160, 164, 185, 186, 204, 208, 211, 221, 232, 264, 270, 273, 277, 280, 284, 287, 317, 329, 362, 387, 398, 402, 404, 422, 429, 431, 449, 37, 298, 359, 9, 17, 35, 40,

41, 105, 111, 146, 166, 234, 279, 343, 384, 412 and 365 of Seq ID No 81; 29-69, 71-88, 95-104, 106-130, 143-189, 205-232, 24-40, 46-64, 65-79, 83-105, 121-129, 144-199, 206-236 and 182-199 of Seq ID No 82; and fragments in 9 amino acid length starting from the position of: 30, 37, 66, 77, 81, 84, 112, 118, 141, 144, 145, 146, 149, 150, 153, 167, 169, 170, 178, 196, 213, 215, 220, 13, 21, 39, 44, 62, 75, 78, 97, 119, 124, 145, 148, 154, 177, 190, 207, 22 and 216 of Seq ID No 82; 4-46, 51-66, 77-88, 102-110, 115-126, 142-148, 171-181, 183-192, 202-212, 227-234, 251-261, 263-278, 283-316, 319-325, 336-352, 362-371, 386-393, 399-406, 410-425, 427-437, 441-450, 457-464, 471-476, 490-496, 514-521, 549-557, 571-578, 601-611, 618-623, 627-646, 657-670, 672-689, 696-704, 726-740, 742-756, 765-776, 778-784, 792-801, 822-836, 862-868, 875-881, 887-898, 914-919, 941-948, 963-969, 971-978, 996-1004, 1007-1016, 1036-1051, 1068-1080, 1082-1090, 1092-1098, 1104-1127, 1135-1144, 1156-1177, 1181-1195, 1197-1206, 1214-1231, 1243-1263, 1278-1284, 1295-1303, 1305-1323, 1337-1346, 1355-1374, 1376-1383, 1406-1423, 1455-1463, 1465-1489, 1506-1518, 1527-1552, 1555-1570, 1581-1589, 1-28, 109-124, 208-220, 261-280, 286-296, 310-324, 398-405, 425-433, 439-454, 504-517, 535-555, 570-591, 599-614, 620-630, 691-699, 711-719, 729-739, 751-760, 783-791, 843-855, 878-886, 890-900, 940-955, 984-1003, 1007-1026, 1065-1073, 1106-1122, 1136-1149, 1188-1198, 1203-1211, 1227-1235, 1249-1256, 1298-1308, 1374-1392, 1398-1409, 1414-1429, 1436-1444, 1456-1490, 1504-1521, 1530-1547, 1592-1609 and 911-935 of Seq ID No 83; and fragments in 9 amino acid length starting from the position of: 26, 33, 79, 170, 200, 265, 290, 297, 302, 304, 333, 334, 377, 412, 414, 415, 431, 436, 458, 465, 481, 494, 536, 546, 568, 605, 678, 690, 697, 703, 724, 729, 730, 735, 737, 767, 776, 797, 840, 861, 938, 968, 999, 1072, 1079, 1085, 1094, 1113, 1160, 1163, 1180, 1188, 1195, 1217, 1245, 1250, 1273, 1302, 1358, 1362, 1363, 1401, 1408, 1465, 1469, 1481, 1507, 178, 960, 1034, 6, 21, 38, 159, 204, 248, 260, 306, 337, 349, 384, 425, 438, 458, 481, 502, 521, 546, 605, 690, 730, 731, 819, 860, 915, 946, 967, 1007, 1018, 1065, 1113, 1187, 1188, 1205, 1223, 1409, 1414, 1495, 1526, 1531, 1537, 101, 255, 1421, 1457, 1538, 1580 and 1589, of Seq ID No 83; 15-25, 41-102, 111-117, 127-134, 145-170, 194-201, 207-225, 10-30, 36-44, 46-59, 57-98, 122-138, 144-160, 162-173, 194-217 and 118-131 of Seq ID No 84; and fragments in 9 amino acid length starting from the position of: 12, 16, 37, 46, 61, 82, 121, 128, 149, 157, 162, 197, 204, 212, 39, 2, 23, 53, 68, 97, 107, 121, 127, 156, 169, 196, 9, 13 and 114 of Seq ID No 84; 7-54, 65-94, 97-103, 154-163, 170-180, 182-199, 216-222, 227-234, 243-256, 267-273, 286-298, 314-322, 324-353, 363-380, 393-401, 424-431, 434-441, 447-470, 475-495, 506-532, 540-548, 554-592, 594-607, 609-617, 619-626, 628-634, 656-662, 8-31, 43-59, 61-75, 93-104, 126-144, 179-201, 244-254, 289-302, 330-338, 364-382, 413-421, 428-466, 476-525, 582-599, 602-619, 621-632 and 115-128 of Seq ID No 85; and fragments in 9 amino acid length starting from the position of: 9, 10, 13, 35, 46, 76, 77, 83, 151, 165, 179, 187, 195, 283, 326, 338, 342, 360, 365, 368, 375, 415, 450, 485, 508, 556, 565, 569, 576, 602, 5, 20, 130, 181, 251, 271, 288, 294, 333, 355, 356, 364, 446, 451, 467, 483, 486, 523, 544, 611, 214, 219, 323, 399, 424 and 458, of Seq ID No 85; 5-21, 32-56, 88-99, 117-124, 128-138, 143-150, 168-180, 183-189, 196-213, 220-240, 254-263, 266-289, 300-313, 321-330, 335-358, 361-371, 380-398, 50-65, 67-87, 96-104, 144-153, 156-164, 169-177, 199-220, 259-289, 324-333, 339-360, 372-385 and 74-93 of Seq ID No 86; and fragments in 9 amino acid length starting from the position of: 26, 33, 49, 88, 96, 129, 169, 170, 198, 257, 268, 281, 337, 342, 366, 391, 393, 39, 122, 248, 76, 106, 117, 185, 190, 198, 238, 257, 266, 280, 341, 344, 350, 367, 304 and 384 of Seq ID No 86; 12-23, 44-50, 54-60, 91-97, 103-109, 119-125, 131-137, 141-151, 172-183, 201-226, 230-238, 252-265, 315-321, 331-345, 360-370, 376-386, 392-406, 410-416, 422-431, 133-159, 208-222, 354-368 and 1-88 of Seq ID No 87; and fragments in 9 amino acid length starting from the position of: 47, 134, 140, 143, 203, 204, 210, 254, 355, 358, 359, 362, 369, 417, 119, 17, 128, 129, 141, 143, 153, 208, 232, 245, 278, 301, 313, 327, 328, 384 and 395 of Seq ID No 87; 4-16, 29-36, 39-64, 69-75, 79-87, 90-122, 126-134, 139-173, 184-190, 195-203, 206-213, 216-228, 234-246, 250-257, 260-266, 274-282, 291-312, 318-325, 340-345, 348-361, 364-388, 399-437, 439-448, 451-464, 467-473, 480-510, 514-520, 534-553, 561-574, 579-589, 593-599, 616-655, 658-671, 3-12, 23-38, 27-38, 43-56, 93-107, 123-137, 144-154, 175-199, 229-244, 288-303, 308-316, 323-337, 410-423, 455-473, 488-496, 531-551, 560-577, 577-591, 619-637, 646-660, 664-672 and 553-570 of Seq ID No 88; and fragments in 9 amino acid length starting from the position of: 36, 101, 123, 129, 136, 146, 156, 160, 194, 205, 219, 236, 245, 283, 289, 350, 402, 413, 437, 475, 505, 517, 542, 585, 605, 620, 627, 657, 34, 52, 88, 358, 540, 656, 3, 8, 13, 32, 82, 105, 111, 117, 137, 167, 173, 180, 182, 262, 300, 306, 350, 409, 412, 423, 499, 500, 563, 568, 581, 585, 627, 628, 554 and 638 of Seq ID No 88; 4-31, 50-80, 83-93, 97-103, 111-

116, 123-132, 134-163, 170-199, 205-210, 215-220, 230-247, 249-278, 280-308, 311-329, 337-347, 349-358, 365-371, 376-401, 417-430, 434-446, 459-505, 511-518, 527-535, 537-545, 547-565, 573-581, 592-601, 1-17, 20-30, 66-80, 100-119, 139-150, 171-182, 186-198, 207-221, 228-242, 258-274, 286-308, 314-330, 337-352, 355-376, 383-391, 417-432, 437-446, 462-473, 479-488, 496-507, 514-522, 541-554, 557-565, 576-585, 589-605, 49-60 and 582-607 of Seq ID No 89; and fragments in 9 amino acid length starting from the position of: 4, 65, 66, 120, 121, 144, 170, 174, 208, 226, 233, 276, 278, 285, 286, 298, 336, 348, 355, 363, 382, 384, 395, 457, 458, 494, 501, 578, 133, 278, 294, 551, 53, 89, 110, 159, 186, 232, 290, 324, 406, 431, 458, 463, 480, 490, 513, 541, 549, 558, 585, 22, 137, 152, 189, 227, 255, 261, 291, 419 and 569 of Seq ID No 89; 9-60, 67-73, 79-93, 109-122, 134-142, 144-153, 165-192, 197-225, 235-244, 259-279, 289-299, 308-317, 321-332, 338-347, 350-361, 373-387, 402-409, 411-421, 439-445, 450-456, 462-468, 470-479, 490-501, 503-516, 16-27, 49-60, 99-122, 136-145, 148-162, 186-194, 213-221, 225-246, 261-275, 281-292, 353-361, 390-401, 451-470, 486-494, 497-516 and 478-490 of Seq ID No 90; and fragments in 9 amino acid length starting from the position of: 15, 22, 28, 29, 48, 49, 106, 107, 114, 147, 170, 177, 188, 208, 209, 212, 256, 280, 287, 316, 451, 468, 489, 33, 217, A03: 36, 98, 124, 136, 142, 153, 177, 188, 251, 262, 291, 320, 323, 383, 417, 464, 487, 491, 492, 505, 44, 86, 146, 411, 437 and 499 of Seq ID No 90; 4-10, 16-28, 3-14, 16-30 and 2-16 of Seq ID No 91; and fragments in 9 amino acid length starting from the position of: 1 and 15 of Seq ID No 91; 8-18, 20-30 and 7-15 of Seq ID No 92; 4-16, 18-27, 2-13, 20-30 and 10-29 of Seq ID No 93; and fragments in 9 amino acid length starting from the position of: 22 and 1 of Seq ID No 93; 36-57, 62-92, 46-66 and 27-35 of Seq ID No 94; and fragments in 9 amino acid length starting from the position of: 84 of Seq ID No 94; 4-18, 1-16 and 5-12 of Seq ID No 95; and fragments in 9 amino acid length starting from the position of: 1, 9 and 2 of Seq ID No 95; 13-27, 38-52, 1-13, 11-25, 27-37 and 17-36 of Seq ID No 96; and fragments in 9 amino acid length starting from the position of: 16, 37 and 20 of Seq ID No 96; 4-17, 27-40, 55-62, 9-25, 34-46, 50-64 and 47-62 of Seq ID No 97; and fragments in 9 amino acid length starting from the position of: 7, 10, 11, 14 and 58 of Seq ID No 97; 4-9, 1-10 of Seq ID No 98; 3-14 and 7-20 of Seq ID No 99; and fragments in 9 amino acid length starting from the position of: 2 and 1 of Seq ID No 99; 7-12, 24-29, 22-30 and 7-21 of Seq ID No 100; and fragments in 9 amino acid length starting from the position of: 4 and 9 of Seq ID No 100; 14-30, 15-30 and 3-18 of Seq ID No 101; and fragments in 9 amino acid length starting from the position of: 1 and 20 of Seq ID No 101; 3-17 of Seq ID No 102; and fragments in 9 amino acid length starting from the position of: 1 of Seq ID No 102; 4-27, 31-59, 75-86, 93-103, 105-110, 15-44, 51-61, 79-95 and 41-50 of Seq ID No 103; and fragments in 9 amino acid length starting from the position of: 11, 15, 24, 28, 31, 35, 36, 42, 48, 49, 53, 78, 79, 97, 20, 28, 35, 37, 43, 49, 60, 65, 77, 85, 86, 21 and 103 of Seq ID No 103; 4-13 and 2-14 of Seq ID No 104; and fragments in 9 amino acid length starting from the position of: 7 and 10 of Seq ID No 104; 4-15, 17-23, 39-52, 4-13, 16-29, 40-50 and 33-41 of Seq ID No 105; and fragments in 9 amino acid length starting from the position of: 3, 38, 14 and 41 of Seq ID No 105; 4-25 of Seq ID No 106; 8-19, 40-47, 67-86, 88-125, 15-25, 48-59, 64-80, 108-118 and 60-70 of Seq ID No 107; and fragments in 9 amino acid length starting from the position of: 7, 110, 16, 34 and 109 of Seq ID No 107; 4-27, 41-46, and 30-47 of Seq ID No 108; and fragments in 9 amino acid length starting from the position of: 19, 1 and 23 of Seq ID No 108; 21-28, 34-43, 8-16 and 23-42 of Seq ID No 109; and fragments in 9 amino acid length starting from the position of: 34, 19, 28 and 39 of Seq ID No 109; 8-20, 24-37, 39-50, 61-67, 69-91, 4-16, 31-42, 84-93 and 42-59 of Seq ID No 110; and fragments in 9 amino acid length starting from the position of: 4, 24, 79, 83, 7, 25, 71, 79 and 91 of Seq ID No 110; 4-25, 31-39, 59-97, 100-118, 120-129, 26-40, 49-57, 66-95, 97-128, 131-139, 38-47 of Seq ID No 111; and fragments in 9 amino acid length starting from the position of: 8, 24, 61, 67, 72, 103, 112, 3, 39, 74, 110 and 119 of Seq ID No 111; 7-24, 32-43, 45-57, 32-48 and 27-43 of Seq ID No 112; and fragments in 9 amino acid length starting from the position of: 14, 18, 38, 47 and 14 of Seq ID No 112; 4-18, 20-26, 31-37, 3-17, 33-43 and 34-53 of Seq ID No 113; and fragments in 9 amino acid length starting from the position of: 3, 7, 10 and 9 of Seq ID No 113; 15-23, 25-39, 43-50, 62-70, 16-32, 61-73 and 67-84 of Seq ID No 114; and fragments in 9 amino acid length starting from the position of: 8 and 64 of Seq ID No 114; 4-13, 28-42, 3-14, 28-39 and 1-20 of Seq ID No 115; and fragments in 9 amino acid length starting from the position of: 31, 7 and 5 of Seq ID No 115; 4-10, 19-26, 21-29 and 5-13 of

- 77 -

Seq ID No 116; 4-22, 40-46, 51-57, 64-76, 2-10, 45-53, 58-72, 73-82 and 33-45 of Seq ID No 117; and fragments in 9 amino acid length starting from the position of: 35, 76, 3, 1 and 66 of Seq ID No 117; 12-24, 27-42, 13-30, 34-44 and 1-9 of Seq ID No 118; and fragments in 9 amino acid length starting from the position of: 36, 15 and 18 of Seq ID No 118; 4-55, 5-15, 17-33 and 26-45 of Seq ID No 119; and fragments in 9 amino acid length starting from the position of: 14 and 53 of Seq ID No 119; 31-42, 45-52, 86-92, 8-16, 35-52, 83-91 and 27-93 of Seq ID No 120; and fragments in 9 amino acid length starting from the position of: 86, 56, 21 and 4 of Seq ID No 120; 237 - 256, 508 - 530 of Seq ID No 61; 227 - 239 of Seq ID No 62; 141 - 160, 168 - 187, 155 - 173 of Seq ID No 63; 101 - 124, 161 - 187, 59 - 85, 80 - 106 of Seq ID No 64; 97 - 112 of Seq ID No 66; 139 - 165 of Seq ID No 67; 10 - 21 of Seq ID No 68; 667 - 688, 677 - 696, 161 - 187, 183 - 209, 205 - 231, 226 - 252 of Seq ID No 69; 603 - 629, 622 - 648, 643 - 669 of Seq ID No 70; 529 - 541 of Seq ID No 71; 12 - 34, 29 - 51, 46 - 67, 62 - 83 of Seq ID No 72; 139 - 151 of Seq ID No 73; 246 - 262, 251 - 275 of Seq ID No 74; 61 - 84, 79 - 102, 97 - 120, 115 - 138 of Seq ID No 75; 325 - 350, 345 - 370, 365 - 389 of Seq ID No 76; 324 - 349, 336 - 351 of Seq ID No 77; 90 - 100 of Seq ID No 78; 274 - 290 of Seq ID No 79; 401 - 419 of Seq ID No 80; 84 - 107, 101 - 123, 117 - 139 of Seq ID No 81; 182 - 199 of Seq ID No 82; 911 - 935 of Seq ID No 83; 118 - 131 of Seq ID No 84; 115 - 128 of Seq ID No 85; 74 - 93 of Seq ID No 86; 21 - 43, 54 - 76 of Seq ID No 87; 554 - 570 of Seq ID No 88; 478 - 490 of Seq ID No 90; 2 - 14 of Seq ID No 91; 7 - 15 of Seq ID No 92; 10 - 28 of Seq ID No 93; 27 - 34 of Seq ID No 94; 17 - 35 of Seq ID No 96; 47 - 61 of Seq ID No 97; 1-10 of Seq ID No 98; 7-20 of Seq ID No 99; 7-20 of Seq ID No 100; 3-17 of Seq ID No 101; 3-17 of Seq ID No 102; 41-50 of Seq ID No 103; 2-14 of Seq ID No 104; 33-41 of Seq ID No 105; 4-25 of Seq ID No 106; 60-69 of Seq ID No 107; 23-41 of Seq ID No 109; 42-59 of Seq ID No 110; 38-46 of Seq ID No 111; 27-43 of Seq ID No 112; 34-53 of Seq ID No 113; 67-84 of Seq ID No 114; 1-20 of Seq ID No 115; 33-45 of Seq ID No 117; 26-45 of Seq ID No 119; 27-53 of Seq ID No 120.

13. A process for producing a *C. pneumoniae* hyperimmune serum reactive antigen or a fragment thereof according to any one of the claims 10 to 12 comprising expressing the nucleic acid molecule according to any one of claims 1 to 6.
14. A process for producing a cell, which expresses a *C. pneumoniae* hyperimmune serum reactive antigen or a fragment thereof according to any one of the claims 10 to 12 comprising transforming or transfecting a suitable host cell with the vector according to claim 7 or claim 8.
15. A pharmaceutical composition, especially a vaccine, comprising a hyperimmune serum-reactive antigen or a fragment thereof, as defined in any one of claims 10 to 12 or a nucleic acid molecule according to any one of claims 1 to 6.
16. A pharmaceutical composition, especially a vaccine, according to claim 15, characterized in that it further comprises an immunostimulatory substance, preferably selected from the group comprising polycationic polymers, especially polycationic peptides, immunostimulatory deoxynucleotides (ODNs), peptides containing at least two LysLeuLys motifs, neuroactive compounds, especially human growth hormone, alumn, Freund's complete or incomplete adjuvants or combinations thereof.
17. Use of a nucleic acid molecule according to any one of claims 1 to 6 or a hyperimmune serum-reactive antigen or fragment thereof according to any one of claims 10 to 12 for the manufacture of a pharmaceutical preparation, especially for the manufacture of a vaccine against *C. pneumoniae* infection.
18. An antibody, or at least an effective part thereof, which binds at least to a selective part of the hyperimmune serum-reactive antigen or a fragment thereof according to any one of claims 10 to 12.

19. An antibody according to claim 18, wherein the antibody is a monoclonal antibody.
20. An antibody according to claim 18 or 19, wherein said effective part comprises Fab fragments.
21. An antibody according to any one of claims 18 to 20, wherein the antibody is a chimeric antibody.
22. An antibody according to any one of claims 18 to 21, wherein the antibody is a humanized antibody.
23. A hybridoma cell line, which produces an antibody according to any one of claims 18 to 22.
24. A method for producing an antibody according to claim 18, characterized by the following steps:
  - initiating an immune response in a non-human animal by administrating an hyperimmune serum-reactive antigen or a fragment thereof, as defined in any one of the claims 10 to 12, to said animal,
  - removing an antibody containing body fluid from said animal, and
  - producing the antibody by subjecting said antibody containing body fluid to further purification steps.
25. Method for producing an antibody according to claim 19, characterized by the following steps:
  - initiating an immune response in a non-human animal by administrating an hyperimmune serum-reactive antigen or a fragment thereof, as defined in any one of the claims 10 to 12, to said animal,
  - removing the spleen or spleen cells from said animal,
  - producing hybridoma cells of said spleen or spleen cells,
  - selecting and cloning hybridoma cells specific for said hyperimmune serum-reactive antigens or a fragment thereof,
  - producing the antibody by cultivation of said cloned hybridoma cells and optionally further purification steps.
26. Use of the antibodies according to any one of claims 18 to 22 for the preparation of a medicament for treating or preventing *C. pneumoniae* infections.
27. An antagonist, which binds to the hyperimmune serum-reactive antigen or a fragment thereof according to any one of claims 10 to 12.
28. A method for identifying an antagonist capable of binding to the hyperimmune serum-reactive antigen or fragment thereof according to any one of claims 10 to 12 comprising:
  - a) contacting an isolated or immobilized hyperimmune serum-reactive antigen or a fragment thereof according to any one of claims 10 to 12 with a candidate antagonist under conditions to permit binding of said candidate antagonist to said hyperimmune serum-reactive antigen or fragment, in the presence of a component capable of providing a detectable signal in response to the binding of the candidate antagonist to said hyperimmune serum reactive antigen or fragment thereof; and
  - b) detecting the presence or absence of a signal generated in response to the binding of the antagonist to the hyperimmune serum reactive antigen or the fragment thereof.
29. A method for identifying an antagonist capable of reducing or inhibiting the interaction activity of a hyperimmune serum-reactive antigen or a fragment thereof according to any one of claims 10 to 12 to its interaction partner comprising:
  - a) providing a hyperimmune serum reactive antigen or a hyperimmune

- 79 -

fragment thereof according to any one of claims 10-12,

- b) providing an interaction partner to said hyperimmune serum reactive antigen or a fragment thereof, especially an antibody according to any one of the claims 18 to 22,
- c) allowing interaction of said hyperimmune serum reactive antigen or fragment thereof to said interaction partner to form a interaction complex,
- d) providing a candidate antagonist,
- e) allowing a competition reaction to occur between the candidate antagonist and the interaction complex,
- f) determining whether the candidate antagonist inhibits or reduces the interaction activities of the hyperimmune serum reactive antigen or the fragment thereof with the interaction partner.

30. Use of any of the hyperimmune serum reactive antigen or fragment thereof according to any one of claims 10 to 12 for the isolation and/or purification and/or identification of an interaction partner of said hyperimmune serum reactive antigen or fragment thereof.

31. A process for *in vitro* diagnosing a disease related to expression of the hyperimmune serum-reactive antigen or a fragment thereof according to any one of claims 10 to 12 comprising determining the presence of a nucleic acid sequence encoding said hyperimmune serum reactive antigen and fragment according to any one of claims 1 to 6 or the presence of the hyperimmune serum reactive antigen or fragment thereof according to any one of claims 10-12.

32. A process for *in vitro* diagnosis of a bacterial infection, especially a *C. pneumoniae* infection, comprising analyzing for the presence of a nucleic acid sequence encoding said hyperimmune serum reactive antigen and fragment according to any one of claims 1 to 6 or the presence of the hyperimmune serum reactive antigen or fragment thereof according to any one of claims 10 to 12.

33. Use of the hyperimmune serum reactive antigen or fragment thereof according to any one of claims 10 to 12 for the generation of a peptide binding to said hyperimmune serum reactive antigen or fragment thereof, wherein the peptide is selected from the group comprising anticalines.

34. Use of the hyperimmune serum-reactive antigen or fragment thereof according to any one of claims 10 to 12 for the manufacture of a functional nucleic acid, wherein the functional nucleic acid is selected from the group comprising aptamers and spiegelmers.

35. Use of a nucleic acid molecule according to any one of claims 10 to 12 for the manufacture of a functional ribonucleic acid, wherein the functional ribonucleic acid is selected from the group comprising ribozymes, antisense nucleic acids and siRNA.